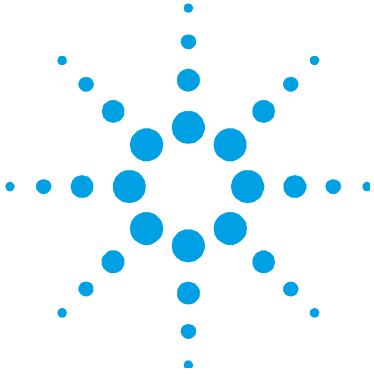

MoniTorr

Models
969-9251, 969-9252, 969-9253, 969-9254

User Manual

87-900-921-01 (F)
04/2011

Agilent Technologies

Notices

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CAUTION

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WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

MoniTorr

TURBO PUMP STATUS
Communication Port
Data Acquisition
POWER
MoniTorr
300/1000

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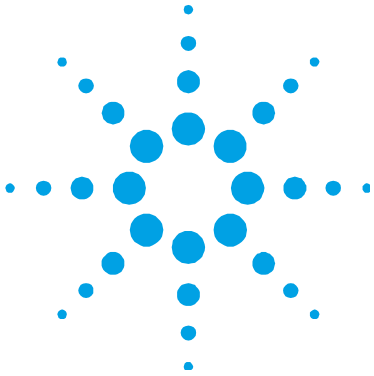

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Overview

This equipment is intended for professional use. Before using such equipment, the operator must carefully read this instruction manual and any other additional information provided by Agilent. Agilent declines all responsibility regarding the total or even partial failure to comply with the instructions provided, the improper usage of the equipment by untrained personnel, unauthorized interventions or usage that fails to comply with specific national regulations. The MoniTorr controller utilizes solid state components and has autodiagnostic and self-protection features. This device analyzes the operating conditions of the turbopump so as to predict any possible pump failure caused by excessive bearing wear. The system continuously monitors the pump, storing in memory all the data relating to the latest period of operation.

The MoniTorr allows to:

- perform programmed maintenance on the turbopump
- continuously monitor and store the turbopump controller-MoniTorr system operating conditions
- identify the wear conditions of one or two bearings.

The following sections provide all the information needed to guarantee the operator's safety when using the equipment. Detailed information is provided in the appendix entitled "Technical Information".

The following conventions are used in this manual:

CAUTION! The Caution messages are provided before procedures that could damage the equipment if not observed.

WARNING! **The Warning messages attract the operator's attention to a specific procedure or step that could cause serious injury if not performed correctly.**

NOTE Notes contain important information extracted from the text.

Storage

The following environmental conditions must be complied with during the MoniTorr transportation and storage:

- temperature: from -20 °C to +70 °C
- relative humidity: 0 – 95 % (non-condensing)

Before installation

The MoniTorr comes in a special protective packaging; if you detect any sign of damage that may have been caused during transportation, contact your local sales office. When unpacking the MoniTorr, be particularly careful to avoid dropping or bumping it. Do not dispose the packaging material in the environment. This material is completely recyclable and complies with the ECC directive 85/399 that safeguards the environment.

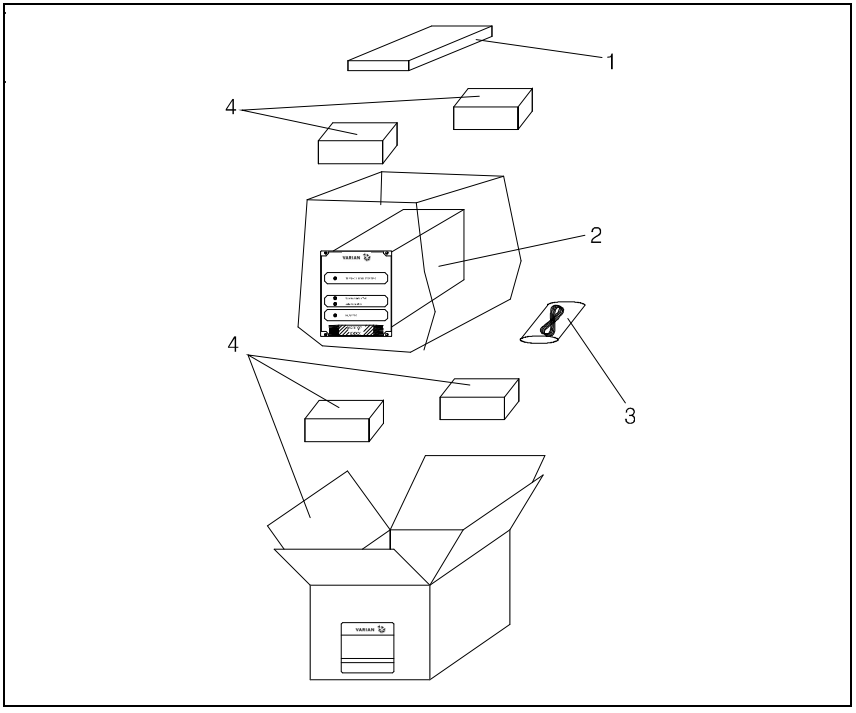


Figure 1 MoniTorr Packaging

1	MoniTorr instruction manual
2	MoniTorr unit
3	MoniTorr accessory envelope
4	Packaging

Installation

WARNING!

The controller comes with a three-wire power cord equipped with internationally approved plugs. Always use this power cord and insert the plug into an appropriately grounded socket to avoid electrical discharges. There are voltages inside the controller that could cause serious injury or death. Before proceeding with any controller installation or maintenance procedure, unplug the controller from the electrical outlet.

NOTE

The controller can be installed either on a table or inside an appropriate rack. In both cases the cooling air flow must circulate freely inside the apparatus. Do not install nor use the controller in environments exposed to atmospheric agents (rain, frost, snow) dust, aggressive gases, in explosive environments or with a high risk of fire.

The following environmental conditions must be complied with during operation:

- temperature: 0 °C to +40 °C;
- relative humidity: 0 - 95 % (non-condensing).

Refer to the section "Technical Information" for the procedures regarding installation and connection to the related pump.

Usage

This section provides the major operating procedures. For more information and for the procedures that involve connections or options, refer to the section “Usage” in chapter “Technical Information”.

Before using the MoniTorr perform all connections and refer to the manual of the connected pump.

WARNING!

To avoid personal injury and damage to the apparatus, if the pump needs to be rested on a table make sure that the table is stable. Never operate the pump if the input flange is not connected to the system or not closed by the closing flange.

Controls, LEDs and Connectors

Shown below is the controller's control panel and interconnection panels. For more information refer to the section "Technical Information".

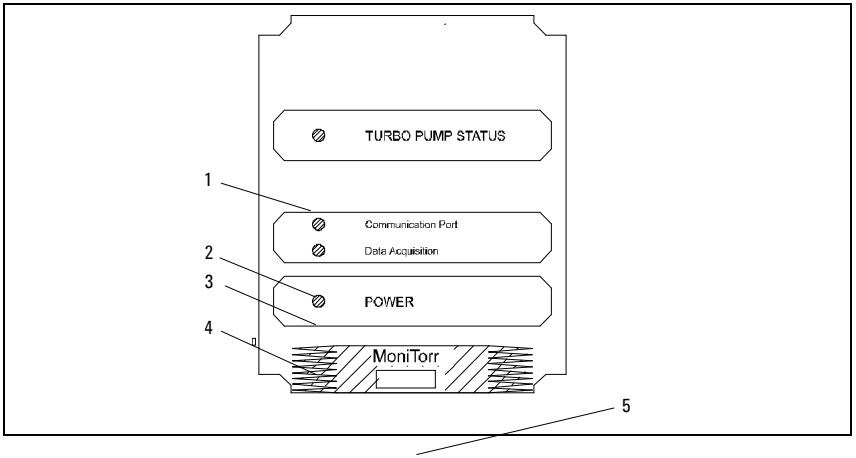


Figure 2 MoniTorr 969-9251, 969-9252, 969-9253 and 969-9254 Front Panel

1	TURBO PUMP STATUS: Function currently not active but available for future evolutions.
2	COMMUNICATION PORT: Flashing yellow LED. It signals the data exchange via serial port with a personal computer or modem. The flashing frequency is not fixed and depends on the status of the data exchange.
3	DATA ACQUISITION: Yellow LED that indicates when the MoniTorr is receiving data from an accelerometer. This LED usually flashes at a frequency between 0.1 and 0.5 seconds.
4	POWER: Green LED that indicates when the controller is powered on. When the main power switch is set to the ON position, this LED is connected directly to the line voltage.
5	Model identification plate: ▪ MoniTorr 300/1000 ▪ MoniTorr 2000

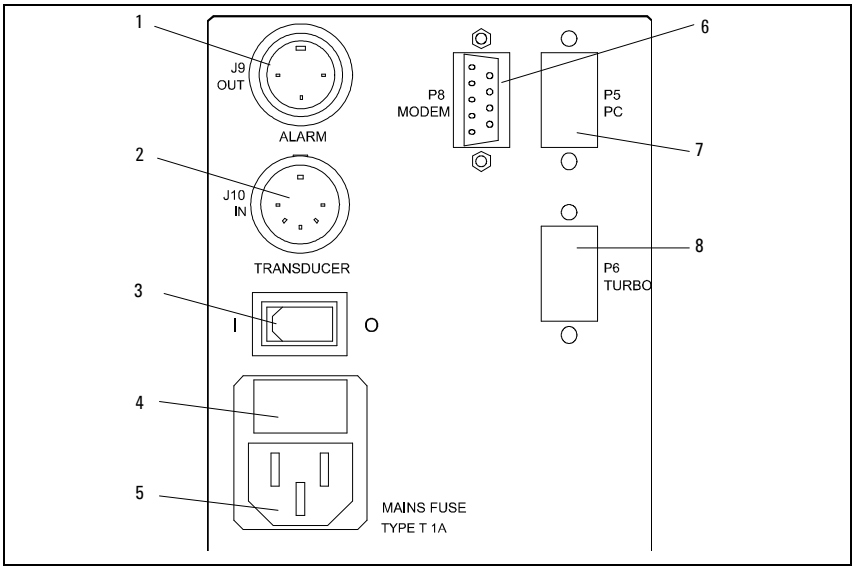


Figure 3 MoniTorr 969-9251, 969-9252, 969-9253 and 969-9254 Rear Panel

1	Connector currently not used but available for future evolutions.
2	Accelerometer connector.
3	Line voltage switch.
4	Fuse chamber (Two type T 1A fuses)
5	Power cord connector.
6	Remote modem connector (remote servicing).
7	Local PC connector, so that the PC can store the major operating parameters of the Turbo pump.
8	Turbo pump controller connector.

Usage procedures

Powering on the MoniTorr

Power on the MoniTorr by plugging the power cord into the electrical outlet and setting the line voltage switch to the I position. The POWER LED comes on and the system proceeds with its selfconfiguration routine by automatically detecting the type of pump and controller connected. Data acquisition and processing will be automatically activated the moment in which the turbo pump reaches its maximum speed (set using the controller's Speed Adjust parameter).

Operation

At predefined intervals, the system will also store data related to the vibration spectrums, power and temperature in addition to other data detected by the Turbo controller thus making it possible to analyze the history of the entire Turbopump-Controller-MoniTorr system throughout the latest period of operation. All the data stored in memory can then be transferred to a PC (by means of the appropriate software; refer to Technical Information) where it is stored and where it can then be analyzed by specialized personnel.

Maintenance

The controllers of the MoniTorr series do not require maintenance. Any intervention must be carried out by authorized personnel. In case of failure, the Agilent Repair Service is available or Advanced Exchange Service that provides you with a regenerated controller in replacement of the faulty one.

WARNING! **Unplug the power cord before proceeding with any type of intervention on the controller.**

If a controller needs to be scraped, proceed in compliance with the specific national norms.

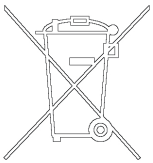
Disposal

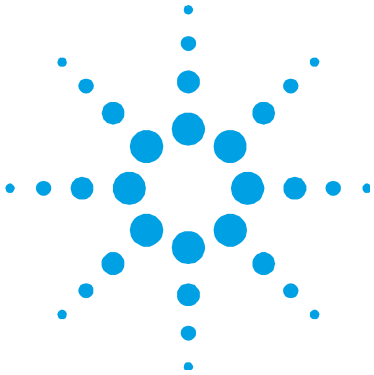
Meaning of the "WEEE" logo found in labels

The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.

This symbol (**valid only in countries of the European Community**) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system.

The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.





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MoniTorr controller description

The MoniTorr is a controller with a microprocessor-based electronic architecture and with dimensions equivalent to 1/4 of a rack. It can work with either the ICE series controllers or with HT series controllers delivered by Agilent later than 01/10/98.

The system has been designed to continuously monitor the turbopump to which it is associated and to maintain in memory all data regarding the turbopump's last period of operation (default = 1 month).

The MoniTorr can work autonomously, replying to the queries received from the local PC via RS232 or remotely via modem (optional).

It is available in the following four versions:

MoniTorr Model	Pump Type	Controller Model
969-9251	TV300 ICE	969-9433/9533
	TV 550 ICE	969-9434/9534
	TV 700 ICE	969-9446/9546
	TV 1000 ICE	969-9447/9547
969-9252	TV 2000 ICE	969-9448/9449
	TV 2000 HT	969-9462/9562
969-9253	TV 300 HT	969-9424/9524
	TV 550 HT	969-9444/9544
	TV 700 HT	969-9445/9545
969-9254	TV 1000 HT	969-9454/9554

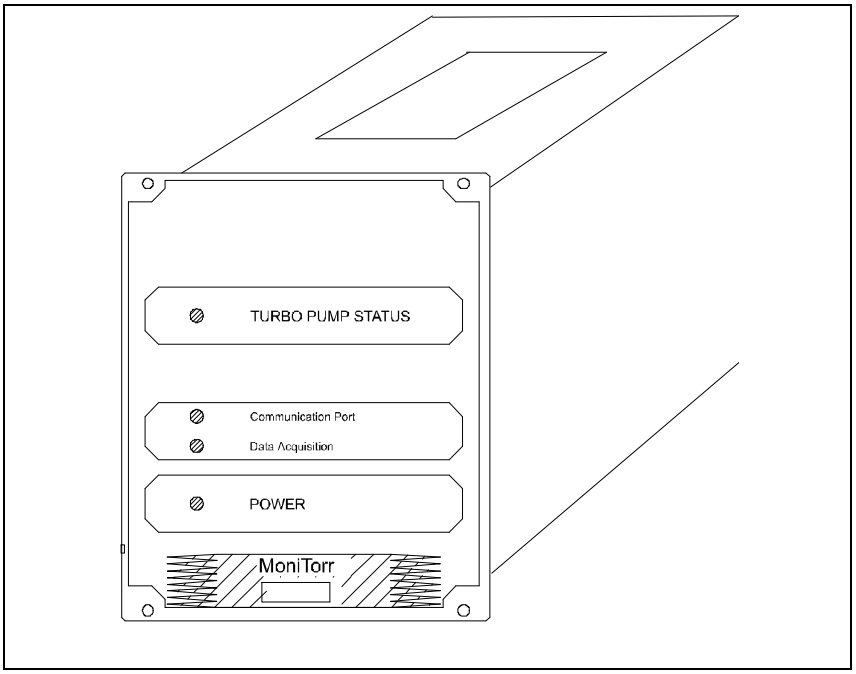


Figure 4 MoniTorr Controller

The MoniTorr is physically connected to the pump's controller from which it receives certain parameters.

For example:

- Current absorption
- Power absorption
- Temperature of the upper bearing

The accelerometer secured to the turbopump detects the spectrum of the low frequency (150 - 2,000 Hz) and of the high frequency (2,000 - 12,000 Hz) vibrations.

WARNING!

The MoniTorr controller is equipped with a 3-wire power cord and plug (internationally approved) for user's safety. Use this power cord and plug in conjunction with a properly grounded power socket to avoid electrical shock. High voltage developed in the controller can cause severe injury or death. Before servicing the unit, disconnect the input power cable.

The following subsystems are embedded into the PCB:

- Power supply
- Amplifier and filter of the signals from the accelerometer
- Signal acquisition logics
- Microprocessor
- 1 MB Flash EPROM used as the mass storage memory
- Serial data exchange management clock and logic
- EEPROM for the storage of the configuration parameters

Controller specifications

Operation	300/1000 HT/ICE 2000 HT/ICE
Input:	
Voltage	90 260 Vac 1-phase
Frequency	47 to 63 Hz
Power	30 VA maximum
Operating temperature	0 °C to +45 °C
Storage temperature	-20 °C to +70 °C
Fuse (mains)	2 x T 1A (slow blow) disregarding the mains
Radio interference suppression	EN 55011 class A group 1 IEC1000-4 -2/3/4
Safety	EN 61010 - 1
Cable	▪ Mains, 3 meters long ▪ RS232 serial cable for connection to the pump controller ▪ RS232 serial cable for connection to the local PC ▪ Cable with accelerometer
Weight:	1.7 Kg (4 lbs)

Controller outline

The outline dimensions for the MoniTorr controllers are shown in the following figures.

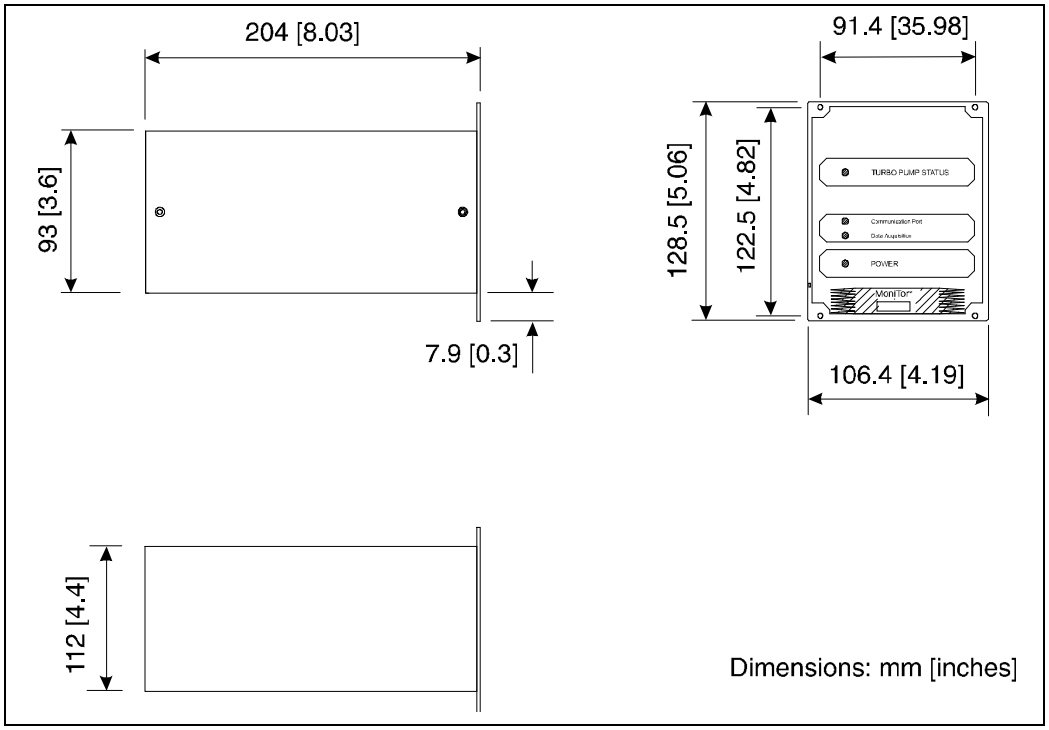


Figure 5 Controller Outline

Installation

The following block diagram provides a schematic approach to the connections to be made for a correct MoniTorr installation.

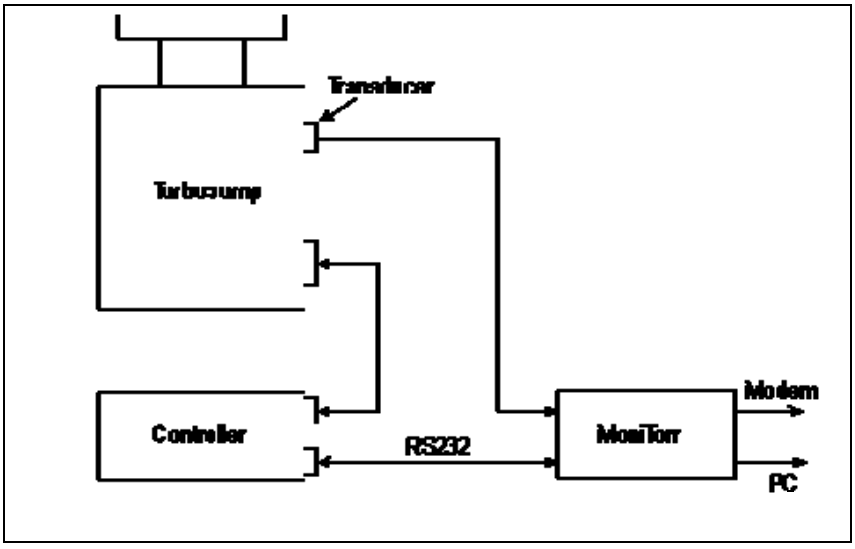


Figure 6 Installation

When performing the connections shown in the diagram above, pay close attention to the installation of the accelerometer.

Accelerometer Installation

To correctly install the accelerometer on the turbopump, use the specific support according to the type of pump being used.

Installation Procedure for the Turbo-V 300/550/700/1000/2000 ICE and 2000 HT Pumps

Proceed as follows for a correct installation:

- Secure support **A** to threaded blind hole **B** present on the pump.

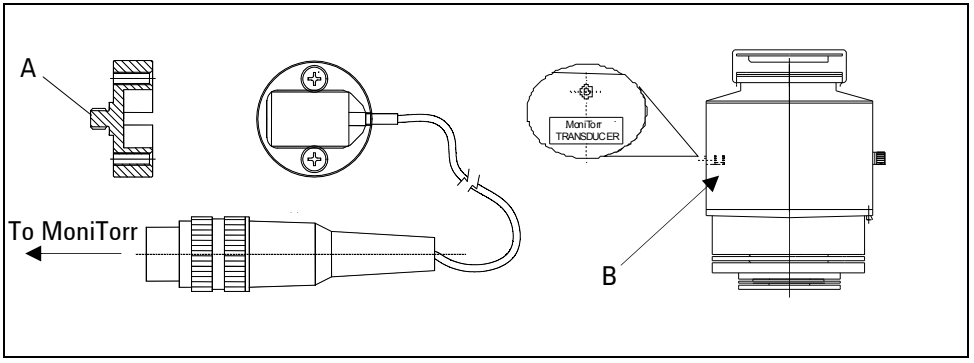


Figure 7 Accelerometer Support for ICE and 2000 HT Series Turbopumps

Installation Procedure for Turbo-V 300/550/700/1000 HT Pumps

Proceed as follows for a correct installation:

- Secure support **A** to pump vent port **B** (there still is the possibility of installing a Vent Valve).

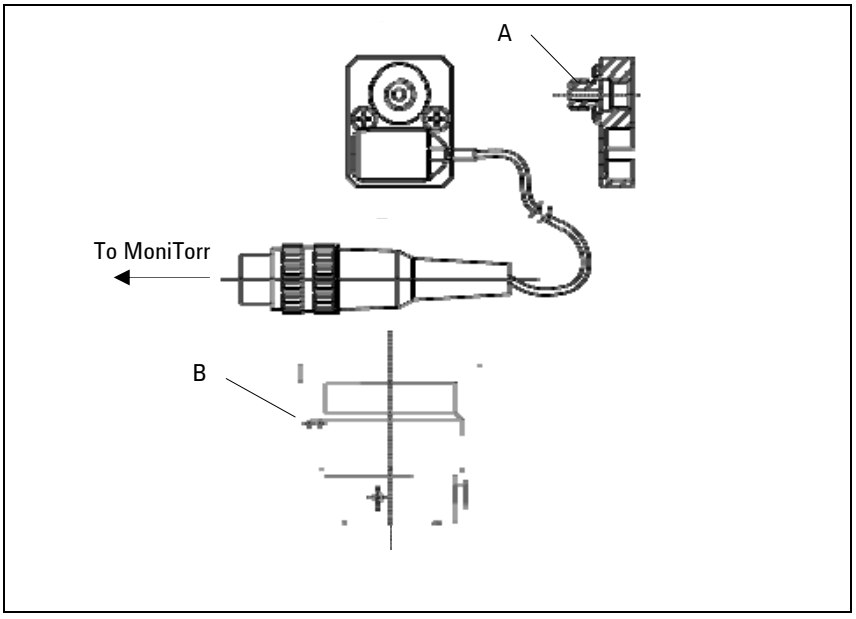


Figure 8 Accelerometer Support for HT Series Turbopumps

Installing the Transfer Software

The MoniTorr is provided with the software needed to transfer via RS232 all the data stored. To install the software launch the Setup file.

NOTE It is suggested that you maintain the directory and path proposed so as to facilitate the identification of the files generated by the system.

Click on the Finish button to continue with installation. The program's activation icon will be generated at the end of the installation procedure.

Interconnections

The following figure shows the controller's interconnections.

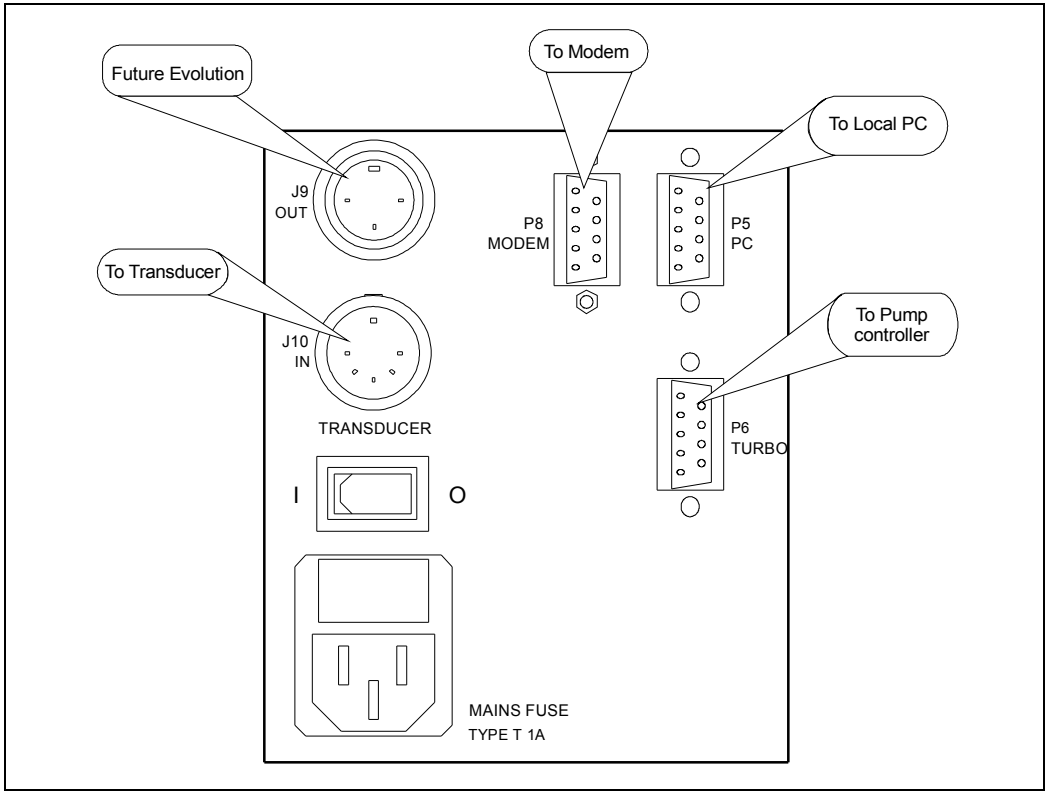


Figure 9 Controller Interconnections

Fuse Holder

Proceed as follows to replace the fuses:

- Unplug the power cord from the controller rear panel socket.
- Using a small screwdriver, pull out the voltage selector and fuses by levering in position A.
- Replace the fuse.

  Use only T-type fuses of the following characteristics:

  - 1 A (slow blow)

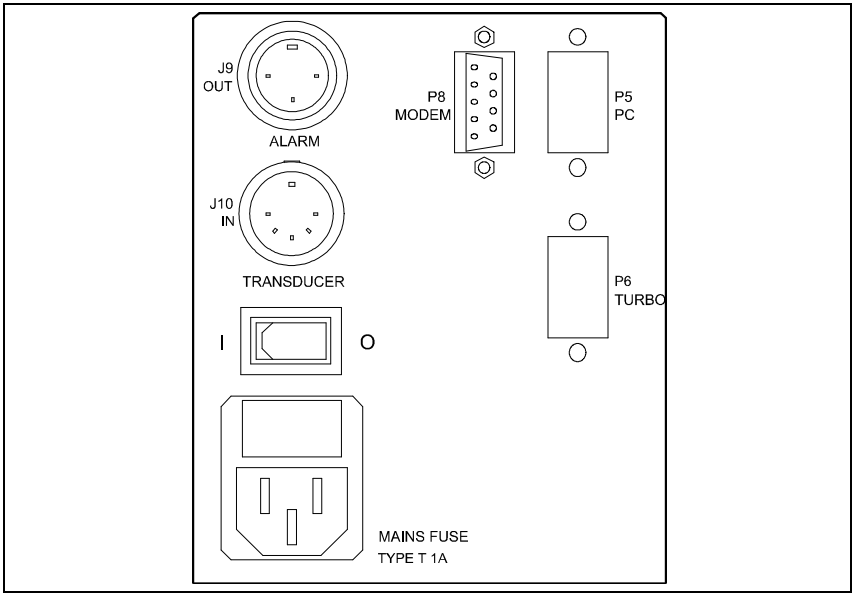


Figure 10 Rear Panel

P5 RS 232 - Data Exchange Descriptions

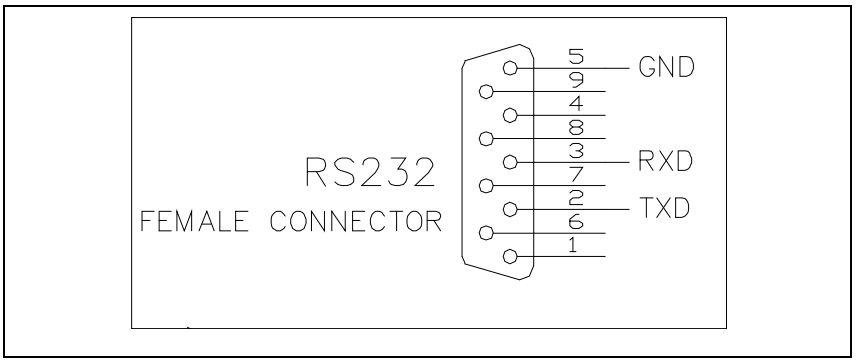


Figure 11 RS 232 Data Exchange Serial Port Connections

Transmission Channel Characteristics

levels:	RS 232
baud rate:	9600
character length:	8 bits
parity:	none
stop bit:	1 bit
protocol:	The type of protocol to be used is compatible with the transfer software protocol.

During the acquisition phase, the MoniTorr replies to each query made by the Host PC with the following message:

0x16 0xEA 0xFF

P8 RS 232 - Data Exchange Descriptions

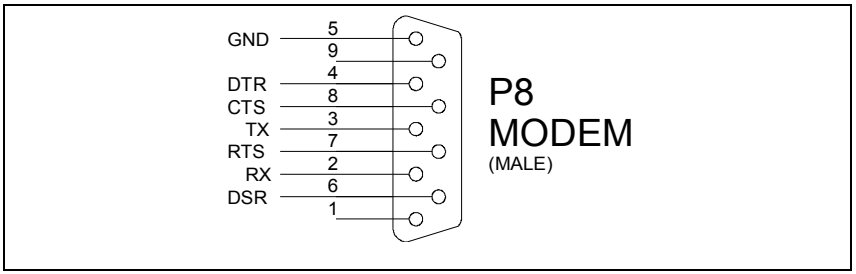


Figure 12 RS232 Serial Connector for the Modem

Transmission Channel Characteristics

levels:	RS 232
baud rate:	9600
character length:	8 bits
parity:	none
stop bit:	1 bit
protocoll:	The type of protocol to be used is compatible with the transfer software protocol.

During the acquisition phase, the MoniTorr replies to each querie made by the Host PC with the following message:

0x16 0xEA 0xFF

This data exchange channel used for the transfer of data via monitor differs from the serial RS232 (connector P5) for the presence of four new signals that are used for managing the data exchanges with the modem.

P6 RS 232 - Data Exchange Descriptions

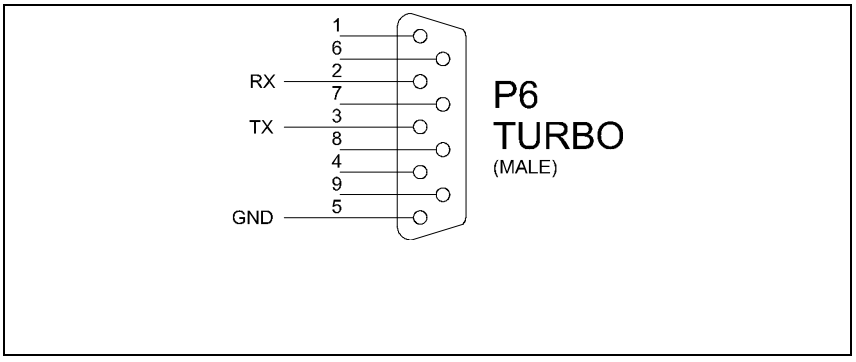


Figure 13 RS 232 Data Exchange Serial Port Connections

Transmission Channel Characteristics

levels:	RS 232
baud rate:	9600
character length:	8 bits
parity:	none
stop bit:	1 bit
protocoll:	The type of protocol to be used is automatically selected by the MoniTorr and depends on the controller to which it is connected.

Connector J9 (Future Evolution)

Connector J9 is currently not used.

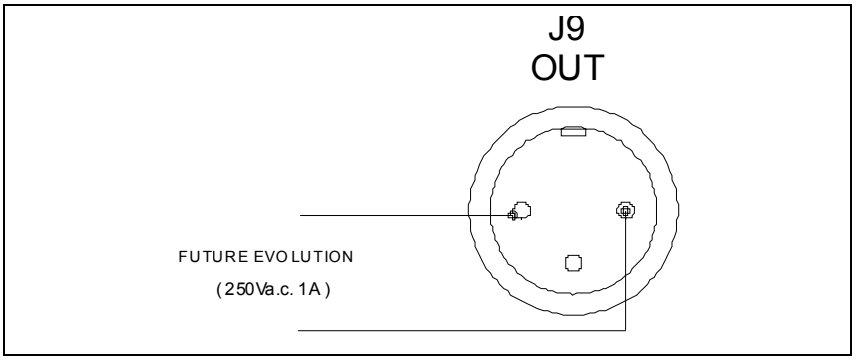


Figure 14 Connector J9 (Future Evolution)

Connector J10 (Accelerometer)

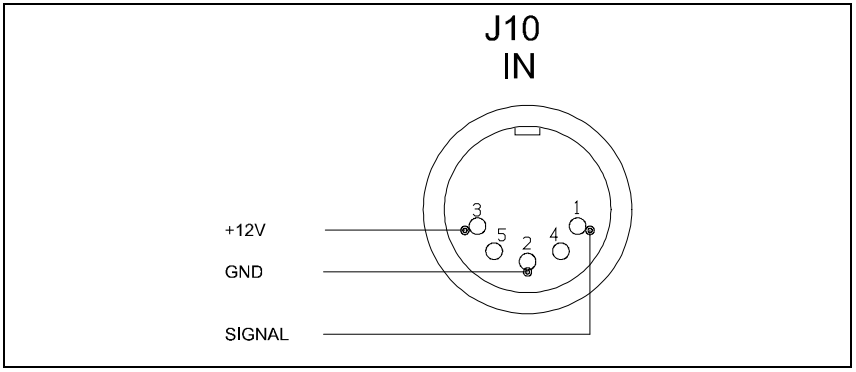


Figure 15 Connector J10 (Accelerometer)

Pins 4 and 5 are not used.

Use

General

Prior to operating the MoniTorr controller, make all vacuum manifold and electrical connections and read this manual.

CAUTION! Before plugging in the controller power cord, be sure that the selected operating voltage matches the power source to avoid equipment damage.

Operating Procedure

Proceed as follows to correctly use the controller:

- Power on the system using the main switch located on the rear panel. The related LED on the front panel will come on.

  By means of a specific procedure, the MoniTorr automatically recognizes the type of pump and controller to which it is connected and automatically configures itself accordingly.

- By using the SpeedAdjust signal, the MoniTorr detects when the pump's maximum rotation speed is reached. At this point the acquisition and analysis of the data deriving from the pump begins and is signalled by the flashing of the Data Acquisition LED (yellow).

  The data acquisition and processing procedure is automatically repeated at 2-minute intervals.

It is furthermore possible to monitor the turbopump-MoniTorr-controller system by using a local PC or a remote PC connected via modem.

Transfer Software

The FILETRAN program acquires the files present in the MoniTorr and stores them on hard disk. This is automatically performed by the program when it is launched, and then at regular intervals depending on the parameters set.

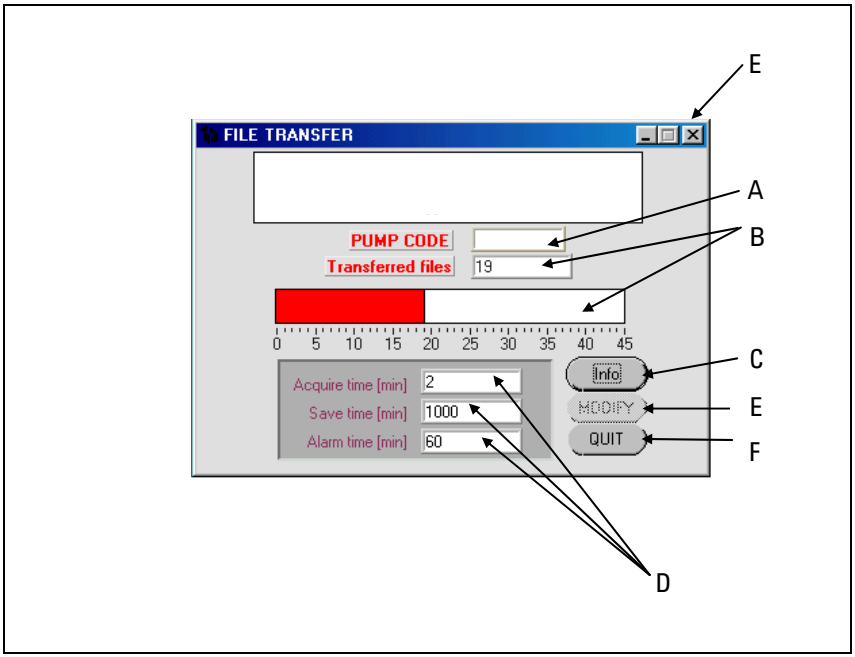
Functionality

As soon as it is activated, FILETRAN establishes a connection with the MoniTorr and updates the data that are present on the panel displayed on the personal computer monitor. If during this stage the MoniTorr does not respond, an appropriate dialog box will signal a communication error in which case you have the option to either Retry or Exit.

Once communication is established, the file uploading procedure will begin. The status indicated on he main panel will be updated as each file is transferred.

When all the files are successfully loaded, FILETRAN will automatically reduce to an icon and remain in standby until the next transfer procedure or until operator intervention.

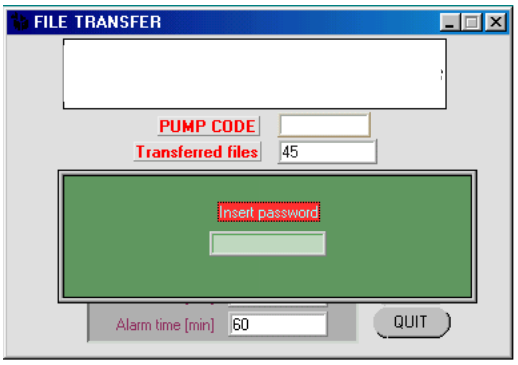
The following figure shows the FILETRAN screen; a brief description of the fields is provided after this screen:



A	This field indicates the model of the pump; if due to a communication problem the name of the model is not recognized, the word 'Unknown' will be displayed in this field.
B	These two fields indicate the progress of the file transfer operation in numeric and graphical format: the progress is updated at the end of each file transfer.
C	Clicking on this button allows you to change the parameters indicated in point D; this button is not active during file transfers.
D	These fields indicate the configuration parameters and can only be changed by clicking on the MODIFY button and entering a password (provided on request).
E	Clicking this button allows you to display the information screen, as shown in the following figure.
F	Clicking on this button exits from the application.

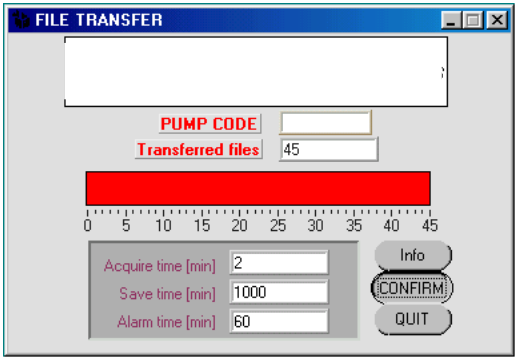
Modifying the Parameters

The operator can change the configuration of the parameters **D** (related to the MONITORR) by clicking on the MODIFY button. When pressing the **C** key you will be asked to enter a password in the following screen display:

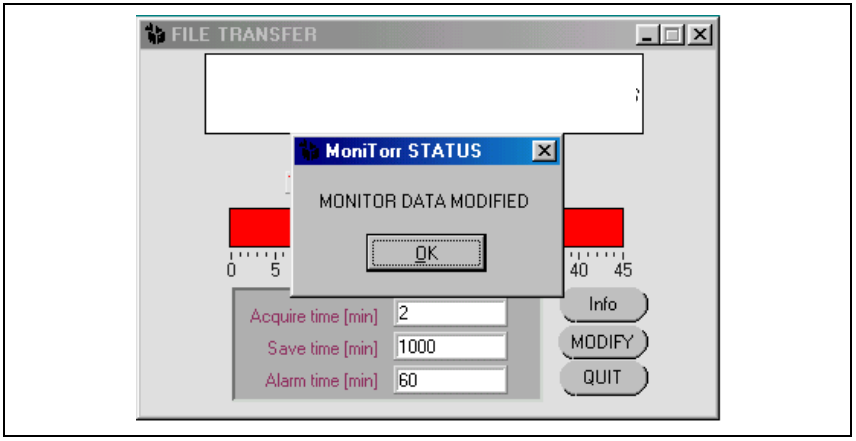


The password that grants access to the time-related parameter modification environment can be entered with small or capital letters.

If an incorrect password is entered, the previous screen will be displayed. If the password is correct, the following screen will be displayed:



It is now possible to modify the parameters and transfer the new values to the MONITORR by clicking on the CONFIRM button. At the end of the operation a dialog box is displayed to inform that the operation ended successfully.



Provided below is a description of the parameters that can be modified:

Acquire time:	Defines the time frame between one MONITORR acquisition and the next. The minimum value for this parameter is 2 minutes.
Save time:	Defines the time frame between two successive storages in the monitor's local memory of the acquisitions indicated above. The default value for this parameter is 1,000 minutes.
Alarm time:	Defines the timeout after which an alarm condition is signaled.

Storing the Files Transferred

The files that are present in the MONITORR are transferred to, and stored in, a directory which is automatically created during installation and which resides in the personal computer where FILETRAN is run.

Provided below is a brief description of the content of each individual directory.

File:	Indicates where the files can be located.
Model number:	Indicates the pump controller model number (9699434 in the example)
Serial number:	Indicates the serial number of the controller to which the MONITORR is connected (00000 in the example); this directory hosts the files that will have to be sent via e-mail to Agilent for the related analysis.
Send:	Name of the directory which is temporarily used by the program to host the files that are moved during the reading phase.

Power Failure

In the event of a power failure (temporary or lasting a long period of time), the controller is switched off. When power is restored, the controller will restart automatically.

Replacement

General

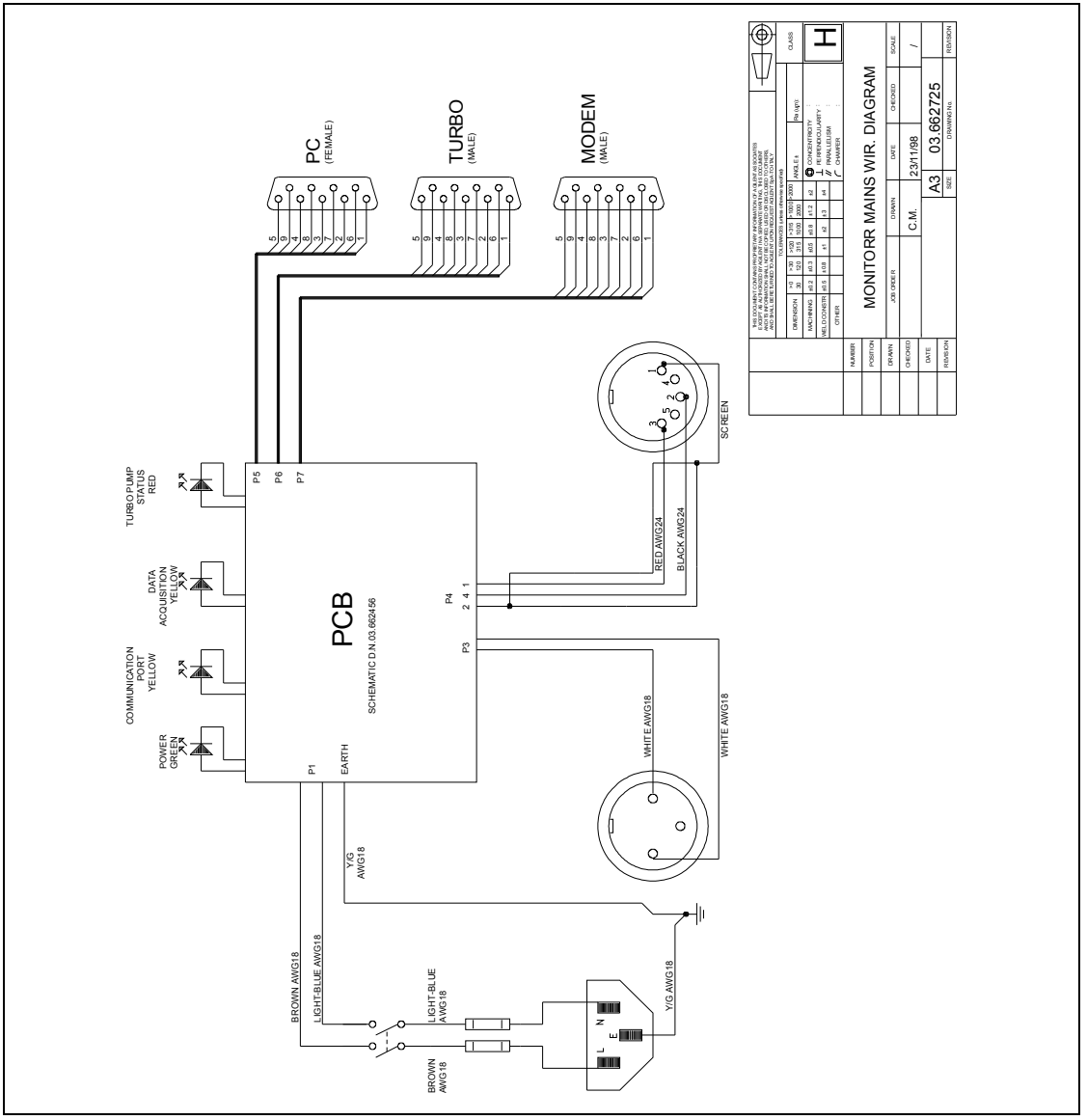
Replacement controllers are available on advance exchange basis through Agilent service/sales organization.

WARNING! **High voltage in the controller can cause severe injury or death. Before servicing, turn power off the controller and unplug the power cord.**

Troubleshooting

At power on the controller undergoes an autodiagnosis routine during which all the LEDs come on for a few seconds.

If a failure is detected the LEDs will remain on. In this case contact Agilent Technical Support.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EARTH
SCREEN
TURBO PUMP STATUS RED
DATA ACQUISITION YELLOW
COMMUNICATION PORT YELLOW
POWER GREEN
RED AWG24
BLACK AWG24
WHITE AWG18
WHITE AWG18
Y/G AWG18
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LIGHT-BLUE AWG18
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MONITORR MAINS WIR. DIAGRAM
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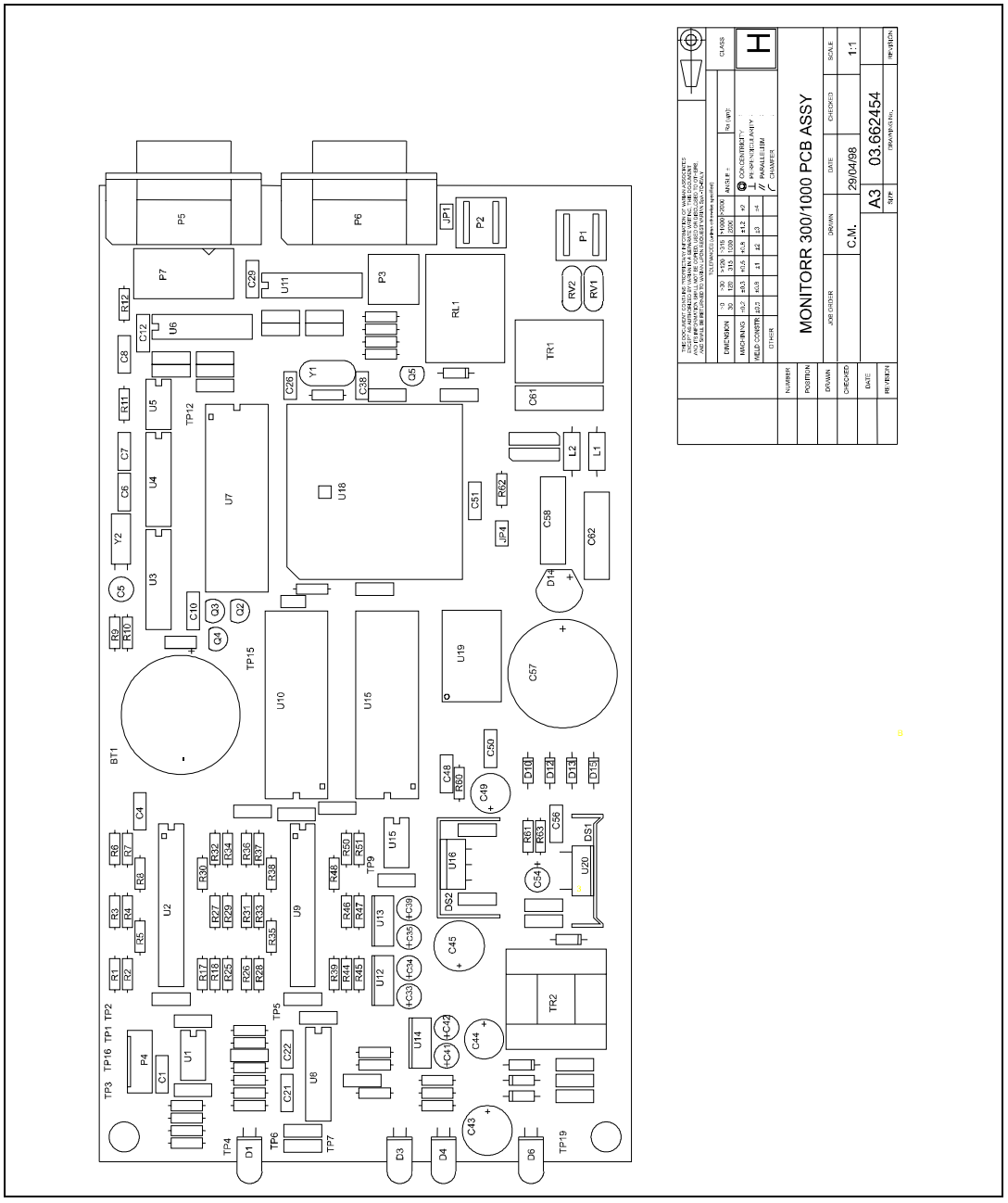
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Agilent Technologies

Vacuum Products Division

Dear Customer,

Thank you for purchasing an Agilent vacuum product. At Agilent Vacuum Products Division we make every effort to ensure that you will be satisfied with the product and/or service you have purchased.

As part of our Continuous Improvement effort, we ask that you report to us any problem you may have had with the purchase or operation of our products. On the back side you find a Corrective Action request form that you may fill out in the first part and return to us.

This form is intended to supplement normal lines of communications and to resolve problems that existing systems are not addressing in an adequate or timely manner.

Upon receipt of your Corrective Action Request we will determine the Root Cause of the problem and take the necessary actions to eliminate it. You will be contacted by one of our employees who will review the problem with you and update you, with the second part of the same form, on our actions.

Your business is very important to us. Please, take the time and let us know how we can improve.

Sincerely.

Giampaolo LEVI

Vice President and General Manager
Agilent Vacuum Products Division

Note: Fax or mail the Customer Request for Action (see backside page) to Agilent Vacuum Products Division (Torino) – Quality Assurance or to your nearest Agilent representative for onward transmission to the same address.

CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO: AGILENT VACUUM PRODUCTS DIVISION TORINO – QUALITY ASSURANCE

FAX N°: XXXX-011-9979350

ADDRESS: AGILENT TECHNOLOGIES ITALIA S.p.A. – Vacuum Products Division –

Via F.lli Varian, 54 – 10040 Leinì (TO) – Italy

E-MAIL: vpd-qualityassurance_pdl-ext@agilent.com

NAME	COMPANY	FUNCTION

ADDRESS:

TEL. N° : _____ FAX N° : _____

E-MAIL: _____

PROBLEM / SUGGESTION :

REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.):

DATE _____

CORRECTIVE ACTION PLAN / ACTUATION (by AGILENT VPD) LOG N° _____

XXX = Code for dialing Italy from your country (es. 01139 from USA; 00139 from Japan, etc.)

Agilent Technologies

Agilent Technologies

Vacuum Products Division
Instructions for returning products

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.

2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).

3) **Important steps for the shipment of returning product:**
   - Remove all accessories from the core product (e.g. inlet screens, vent valves).
   - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
   - If ordering an Advance Exchange product, **please use the packaging from the Advance Exchange to return the defective product.**
   - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
   - Agilent Technologies is not responsible for returning customer provided packaging or containers.
   - **Clearly label package with RA number.** Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.

4) Return only products for which the RA was issued.

5) **Product being returned under a RA must be received within 15 business days.**

6) **Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information.** Customer is responsible for freight charges on returning product.

7) Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED **REQUEST FOR RETURN** FORM TO YOUR NEAREST LOCATION:

EUROPE:	**NORTH AMERICA:**	**PACIFIC RIM:**
Fax: 00 39 011 9979 330		
Fax Free: 00 800 345 345 00	Fax: 1 781 860 9252	please visit our website for individual
Toll Free: 00 800 234 234 00	Toll Free: 800 882 7426, Option 3	office information
vpt-customercare@agilent.com	vpl-ra@agilent.com	http://www.agilent.com

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please read important policy information on Page 3 that applies to all returns.

1) CUSTOMER INFORMATION

Company Name:	**Contact Name:**
Tel: **Email:**	**Fax:**
Customer Ship To:	**Customer Bill To:**
Europe only: **VAT reg. Number:**	USA/Canada only: ☐ **Taxable** ☐ **Non-taxable**

2) PRODUCT IDENTIFICATION

Product Description	Agilent P/N	Agilent S/N	Original Purchasing Reference

3) TYPE OF RETURN (**Choose one from each row** and supply Purchase Order if requesting a billable service)

3A. ☐ Non-Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form):

3B. ☐ Exchange ☐ Repair ☐ Upgrade ☐ Consignment/Demo ☐ Calibration ☐ Evaluation ☐ Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.
Call Agilent Technologies to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

☐ **HAS NOT** pumped or been exposed to any toxic or hazardous materials. OR

☐ **HAS** pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive

List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula:

_____

NOTE: If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, **the customer will be held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Print Name: **Authorized Signature:** ..... **Date:**

5) FAILURE INFORMATION:

Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms):
Detailed Description of Malfunction: (Please provide the error message)
Application (system and model):

I understand and agree to the terms of Section 6, Page 3/3.
Print Name: **Authorized Signature:** ..... **Date:**

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please use these Failure Mode to describe the concern about the product on Page 2.

TURBO PUMPS and TURBO CONTROLLERS

APPARENT DEFECT/MALFUNCTION		POSITION	PARAMETERS	
- Does not start	- Noise	- Vertical	Power:	Rotational Speed:
- Does not spin freely	- Vibrations	-Horizontal	Current:	Inlet Pressure:
- Does not reach full speed	-Leak	-Upside-down	Temp 1:	Foreline Pressure:
- Mechanical Contact	-Overtemperature	-Other:	Temp 2:	Purge flow:
- Cooling defective	-Clogging	.....	OPERATING TIME:	

ION PUMPS/CONTROLLERS

- Bad feedthrough	- Poor vacuum
- Vacuum leak	- High voltage problem
- Error code on display	- Other

VALVES/COMPONENTS

- Main seal leak	- Bellows leak
- Solenoid failure	- Damaged flange
- Damaged sealing area	-Other

LEAK DETECTORS

- Cannot calibrate	-No zero/high backround
- Vacuum system unstable	- Cannot reach test mode
- Failed to start	- Other

INSTRUMENTS

- Gauge tube not working	- Display problem
- Communication failure	- Degas not working
- Error code on display	- Other

SCROLL AND ROTARY VANE PUMPS

- Pump doesn't start	- Noisy pump (describe)
- Doesn't reach vacuum	- Over temperature
- Pump seized	- Other

DIFFUSION PUMPS

- Heater failure	- Electrical problem
- Doesn't reach vacuum	- Cooling coil damage
- Vacuum leak	- Other

Section 6) *ADDITIONAL TERMS*

Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.

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